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Claims

- 1. A separator for use in an alkaline zinc alkaline battery comprising
- a cellulose film regenerated from a solution of cellulose, said cellulose having hydrocarbon cross-links containing 4 to 16 carbon atoms.
 - 2. A separator according to claim 1 in which the cross-links are attached to hydroxyl sites on the cellulose.
 - 3. A separator according to claim 2 in which 0.5% to 10% of the available hydroxyl sites contain said cross-links.
 - 4. A separator according to claim 3 in which the cross-linking agent is an alkylene chain containing 4 to 12 carbon atoms.
 - 5. A separator according to claim 1 in which the cellulose is selected from the group consisting of microgranular cellulose, cotton fiber, paper and microcrystalline cellulose.
 - 6. A zinc alkaline battery comprising in combination: an alkali resistant battery case;
 - a body of alkaline electrolyte;
- a zinc electrode having a portion thereof in contact with said body of electrolyte;
 - a counter electrode having a portion thereof in contact with said body of electrolyte; and
- a cellulose separator disposed between said electrodes having no more than 10% of hydroxyl sites on cellulose

 30 chains cross-linked with a hydrocarbon group containing 4 to 16 carbon atoms.

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- 7. A battery according to claim 6 in which the hydrocarbon group is an alkylene group containing 6 to 12 carbon atoms.
- 8. A battery according to claim 7 in which the cellulose is selected from the group consisting of microcrystalline cellulose, microgranular cellulose, cotton fiber and paper.
 - 9. A battery according to claim 7 in which the counter electrode comprises silver.
- 10. A method of forming a separator for an alkaline zinc alkaline battery comprising the steps of:

dissolving cellulose in an organic solvent to form a solution;

deprotonizing from 0.5% to 10% of hydroxyl groups on the cellulose;

adding a hydrocarbon polyhalide containing 4 to 16 carbon atoms to the solution and reacting the halide atoms with the deprotonizing sites to form cross-links;

forming a film of said solution containing crosslinked cellulose; and

drying the film to form a separator.

- 11. A method according to claim 10 in which the separator has a thickness from 10 microns to 250 microns.
- 12. A method according to claim 11 in which the cellulose is selected from the group consisting of microgranular cellulose, cotton fiber, paper and microcrystalline cellulose.
 - 13. A method according to claim 12 in which the cellulose has a degree of polymerization from 200 to 1200.
- 30 14. A method according to claim 10 in which substantially all the deprotonized sites are reacted with cross-linking agent.

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- 15. A method according to claim 10 in which the halide is an iodide,
- 16. A method according to claim 10 in which the solvent comprises a polar aprotic solvent and an alkali metal salt.
- 17. A method according to claim 16 in which the 3 to 8% by weight of the alkali metal salt is present based on weight of polar aprotic solvent.
- 18. A method according to claim 17 in which the metal salt is lithium chloride and the polar aprotic solvent is DMAC.
 - 19. A method according to claim 16 in which the solvent is present in the solution in an amount of 1 to 11% by weight.
- 20. A method according to claim 10 in which the cellulose is deprotonized by adding an inorganic base to the solution.